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PRODUCTION OF SHEET AND SAFETY GLASS

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Production of various types of glass at Borskii Glass Works is reviewed.

Since the 90s depression of the economy in Russia has had a negative influence on industry as a whole, and including the building and automotive industries.

The market for building glass in Russia is now divided into three main groups:

- low quality building glass for industrial and construction engineering (vertical glass ribbon drawing)
- polished building glass mostly used in construction engineering (float-lines)
- double-glazed windows providing effective heat and sound insulation
- advanced glass: bullet-proof, safety glass, triplex, tempered safety glass, light-reflecting glass, etc.

Russian vendors essentially produce the first two types of glass (unpolished and polished glass) and unless and until the purchasing power of the Russian citizens increases, the domestic demand for double windows and special glass will leave much to be desired.

The Borskii Glass Works, however, mainly produces high-quality glass on LPS-1 and LPS-2 lines.

Process control (mixing, glass melting, annealing, glass grading and cutting) is performed using a FMS computer. Industrial television facilities are used for glass melting surveillance (in the tank) and in situ monitoring of glass ribbon forming (inside the float-tank). The process of polished glass production is mechanized and fully automatic.

The performance specifications of the two polished glass production lines using the float-method at the Borskii Glass Works are listed in Table 1.

The Borskii Glass Works is a leader in polished glass production in Russia and OEM supplier of the Russian Automotive Works.

The Borskii Glass Works was founded in 1930 and put into service in 1934. The Works occupies an area of 71 ha, where 21 workshops, office buildings, repair bases, and depots are situated. The built-up area is sufficient for further development and expansion of plant facilities.

Originally sheet construction glass was produced at the Borskii Works using vertical drawing. Production of mirrors, triplex, hardened glass, mechanically polished glass, and low-alkali glass was developed in 1936, 1940, 1948, 1949, and 1960, respectively.

Making use of the experience gained in Western Europe, we have developed modern processing engineering at Borskii Glass Works since the 70s. In 1970, we launched production of top-quality automotive triplex on a float-glass production line (Pilkington Co.). Then we developed production of hardened pressed glassware, hardened automotive glass (1986) and a second float-line was put into service.

The annual output of the Works is about 25 mln m² of polished glass, 2.5 mln m² of shaped glass and flat automotive triplex, 3.5 mln m² of hardened automotive glass, 40 mln pieces of glassware, 300,000 m² of double glass panes, and 65,000 m² of automotive mirrors.

There are about 30 producers of glass in Russia. Float glass is manufactured only at Borskii, Saratovskii, and Salavatskii Glass Works. In 1996 more than half of the production of building glass and almost the entire output of automobile glass was obtained at these Glass Works.

About 100 mln ton of building glass and about 4.5 mln tons of automotive glass were produced at the Russian Glass Works in 1996. The power filling (duty) factor at all glass works in Russia is 50% (on average) whereas at Borskii,

TABLE 1

Index	Glass production line	
	LPS-1	LPS-2
Performance, ton/day	360 – 480	390 – 600
Glass mass volume, ton	1630	1830
Dimensions of the melting zone, m:		
length	39.75	32.75
width	9.8	9.8
depth	1.2	1.4
Hearth, m ² :		
melting area	389	320
cooling area	128	225
Dimensions of the tin melt tank, m:		
length	46	61
width	6.6	7.2
Gas flow, m ³ /h	4000 – 4400	4600 – 5200
Fuel consumption at maximum pull, kcal/kg	1900	1850
Maximum pull, kg/m ² per day	1820	2300

¹ Joint Stock Company Borskii Glass Works, Russia.



Fig. 1. Polished glass production department. Glass furnace control panel (insert).

Saratovskii, and Salavatskii Glass Works the same factor is 70% (at the Borskii Works it attains 87%).

The Borskii Works, a recognized leader of the glass industry in Russia, plays first violin in the internal market of automotive and polished building glass. According to the statistical data, the output of the Borskii Glass Works in percentage of total glass output in Russia is 87% (triplex); 72% (hardened glass); and 44% (polished building glass).

High glass quality in addition to comparatively low plant costs make it possible to maintain and even gradually increase the share of the Borskii Glass Works in Russian and foreign markets.

Actually, the market of high quality building glass is shared between Borskii (44%), Saratovskii (37%), and Salavatskii (19%) Glass Works.

The wide product range of the Borskii Glass Works includes wind-screen and stained automotive glass. Automotive triplex and hardened glass is delivered from the Borskii Works to all Russian automotive concerns, i.e., VAZ, GAZ, ZIL, etc. Effective market policy and product diversification make it possible to maintain the high output of automotive glass at Borskii Glass Works.

The Borskii Works meets the ever-growing consumer demands and increases profits, thus forming grounds for further development of new types of products:

- wind-screen glass for Mercedes, Volvo, Honda, BMW, Mitsubishi, FIAT, etc.
- large-size wind-screen glass for Gazel' (a new model of Gor'kovskii Automotive Works)
- bullet-proof glass, decorative glass, large mirrors, etc.

The Works places primary emphasis on the quality of the products, thus enjoying a persistent superiority in the glass market.

According to the Russian State Standard each type of automotive glass must be certified, whereas for other types of glass certification it is not compulsory. However, the Borskii Glass Works has certified all types of products including automotive, double, sheet, and bullet-proof glass at the State Standard Bureau and State Building Committee of Russia.

The international quality standards for automotive glass are extremely stringent. Nowadays, the Borskii Glass Works has obtained approval certificates for all types of automotive glass in conformity with European and American safety standards for wind-screen (triplex), side and zone-heated rear windows (hardened glass).

Each type of automotive glass from the Borskii Glass Works is marked with brand and approval marks.

Moreover, to confirm the competitive ability of Borskii glass on domestic and foreign markets, we will certify the products in accordance with international standard ISO 9000 in 1998.